Warm up

Simplify Square roots.

① $\sqrt{96}$

$96 = 2 \cdot 48$

$48 = 2 \cdot 24$

$24 = 6 \cdot 4$

$6 = 2 \cdot 3$, $4 = 2 \cdot 2$

$\sqrt{2 \cdot 2 \cdot 2 \cdot 3 \cdot 2 \cdot 2}$

$2 \cdot 2\sqrt{2 \cdot 3}$ $\quad 4\sqrt{6}$

② $\sqrt{245}$

$245 = 5 \cdot 49$

$49 = 7 \cdot 7$

$\sqrt{5 \cdot 7 \cdot 7}$

$7\sqrt{5}$

Notes #2 imaginary #s

are caused when there is a negative inside $\sqrt{\ }$

$\sqrt{-1}$ is i

we must remove the negative before we simplify

Ex 1.

$$\sqrt{-4} = \sqrt{-1} \cdot \sqrt{4}$$

separate the negative

$i\sqrt{4}$ use prime factorization

$4 = 2 \cdot 2$

$i\sqrt{2 \cdot 2}$

$2i$ # is first, i is second

Similar 2X

Ex 2. $\sqrt{-75} \rightarrow \sqrt{-1} \cdot \sqrt{75}$ $\quad \sqrt{-1} = i$

Separate negative

$i\sqrt{75}$

$3 \cdot 25$

$5 \cdot 5$

$i\sqrt{3 \cdot 5 \cdot 5}$

$5i\sqrt{3}$ square root last

Ex 3. $\sqrt{-56}$

$i\sqrt{56}$

$7 \cdot 8$

$2 \cdot 4$

$2 \cdot 2$

$i\sqrt{7 \cdot 2 \cdot 2 \cdot 2}$

$2i\sqrt{14}$

Try these:

① $\sqrt{-9}$

$i\sqrt{9}$

$3 \cdot 3$

$i\sqrt{3 \cdot 3}$

$3i$

② $\sqrt{-7}$

$i\sqrt{7}$

$1 \cdot 7$

$i\sqrt{7}$

③ $\sqrt{-500}$

$10 \cdot 50$

$2 \cdot 5 \quad 5 \cdot 10$

$2 \cdot 5$

$i\sqrt{2 \cdot 5 \cdot 5 \cdot 2 \cdot 5}$

$2.5i\sqrt{5}$

$10i\sqrt{5}$